

**GAC Chemical Corporation
Waldo County
Searsport, Maine
A-171-71-J-M/R**

**Departmental
Findings of Fact and Order
Air Emission License**

After review of the air emissions license application, staff investigation reports and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 M.R.S.A., Section 344 and Section 590, the Department finds the following facts:

I. REGISTRATION

A. Introduction

1. As of December 1, 1999, General Alum & Chemical Corporation changed its name to GAC Chemical Corporation. This change is in name only. No Changes in ownership, facility management or operations have occurred.
2. GAC Chemical Corporation (GAC) of Searsport, Maine has applied to renew their Air Emission License permitting the operation of emission sources associated with their chemical manufacturing facility.
3. GAC has requested a minor revision to their license in order to include a Fish Oil Processing System.

B. Emission Equipment

GAC is authorized to operate the following equipment:

Fuel Burning Equipment

<u>Equipment</u>	<u>Maximum Capacity (MMBtu/hr)</u>	<u>Maximum Firing Rate (gal/hr)</u>	<u>Fuel Type, % sulfur</u>	<u>Date Installed</u>	<u>Stack #</u>
Boiler #1	20.7	138	#2, 5, or 6 fuel oil, 0.7%	1988	1
Boiler #2	6.9	46	#2, 5, or 6 fuel oil, 0.7%	1989	1

Process Equipment

<u>Equipment</u>	<u>Production Rate</u>	<u>Pollution Control Equipment</u>	<u>Date Installed</u>	<u>Stack #</u>
#1 Alum Digester	9 ton/hr	none	1998	3
Ammonium Sulfate Reactor	4 ton/hr	demister & cyclones	1992	5
Ammonium Sulfate Dryer	4 ton/hr	venturi scrubber	1992	6
Sodium Aluminate Reactor	6.25 ton/hr	none	1982	7
Pneumatic Aluminum Trihydrate Conveyor	15 ton/hr	4 baghouses w/only 1 outside vent	1982	8
Aqueous Ammonia Production System	10 ton/hr	venturi scrubber & bubble tank	1995	9
Fish Oil Processing System	20 ton/day	scrubber	1999	10

- C. GAC does have one diesel generator. The maximum capacity of the generator is 0.4 MMBtu/hr and is therefore listed for inventory purposes only.
- D. Since their last license GAC has removed the Bauxite Grinding Operation and the #2 Alum Digester.
- E. Application Classification

The changes requested in the application will increase emissions by less than 4 ton/year for each single pollutant and less than 8 ton/year for all pollutants combined. Therefore, this license is considered to be a renewal with a minor revision and has been processed as such.

II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in Chapter 100 of the Air Regulations. Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

BPT for new sources and modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in Chapter 100 of the Air Regulations. BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

BPT for existing emissions equipment means that method which controls or reduces emissions to the lowest possible level considering:

- the existing state of technology;
- the effectiveness of available alternatives for reducing emission from the source being considered; and
- the economic feasibility for the type of establishment involved.

B. Boilers #1 & 2

Boilers #1 was installed in 1988 prior to the New Source Performance Standards (NSPS) Subpart Dc applicability date. Boiler #2 is smaller than 10 MMBtu/hr and is therefore also not subject to NSPS Subpart Dc.

A summary of the BPT analysis for Boiler #1 (20.7 MMBtu/hr) and #2 (6.9 MMBtu/hr) is the following:

1. The total fuel use for the facility shall not exceed 850,000 gal/year of #2, 5, 6 fuel oil, or any combination of the three, based on a 12 month rolling total, with a maximum sulfur content not to exceed 0.7% by weight.
2. Chapter 106 regulates fuel sulfur content, however the use of 0.7% sulfur by weight fuel is more stringent and shall be used.
3. Chapter 103 regulates PM emission limits. The PM₁₀ limits are derived from the PM limits.
4. NO_x emission limits are based on data from similar boilers of this size and age.
5. CO and VOC emission limits are based upon AP-42 data dated 9/98.
6. Visible emissions from the boilers shall not exceed 30% opacity on a 6 minute block average, except for no more than 2 six minute block averages in a continuous 3 hour period.

C. Alum Production

The alum production operation was installed in 1952. In 1980 the process was converted from use of bauxite as one of the raw materials to aluminum trihydrate (ATH), however the equipment itself remained unchanged. Alum is produced by reacting ATH with sulfuric acid. The reaction is conducted in atmospheric batches of approximately 27 tons each. The exothermic reaction releases excess heat via the generation of steam. The exhaust steam is vented through stack #3 extending above the production building.

D. Ammonium Sulfate Production

The original ammonium sulfate production operation was installed in 1949. An amendment to the air emission license was issued on August 28, 1992 to relocate the ammonium sulfate production operation in addition to reconstructing the original reactor/crystallizer. An identical unit was constructed with minor

modifications due to product quality concerns. The dryer was relocated without any modifications, only maintenance activities were performed (i.e., cleaning, adjustment, and painting). The ammonium sulfate production operation consists of an ammonia sulfate reactor followed by a cyclonic separator and an ammonia sulfate dryer followed by a venturi scrubber.

Ammonium sulfate is produced from the reaction between anhydrous ammonia and sulfuric acid. The reactor is fitted with an internal demister and an external cyclonic separator for particulate matter control prior to exiting the stack. GAC has proposed that the particulate emissions from the mist eliminator followed by the cyclonic separator are expected to be de minimus, based on EPA studies (EPA-450/3-79-034a, Ammonium Sulfate Manufacture—Background Information for Proposed Emission Standards). Solids that are collected from the cyclonic separator are returned to the reactor vessel.

The ammonium sulfate exits the reactor and enters the ammonium sulfate dryer via a product centrifuge. The product centrifuge separates the product from the filtrate. The filtrate is then returned to the reactor/crystallizer for continued processing.

According to the New Source Performance Standards (NSPS), 40 CFR Part 60, Subpart PP, the ammonium sulfate dryer is the only applicable designated unit of an ammonium sulfate facility. NSPS applies to dryers which commenced construction or modifications after February 4, 1980. Reactor vessels are not identified nor are they defined to be a component of ammonium sulfate dryers. Since the dryer was originally installed prior to 1980 and no modification occurred when it was relocated, the dryer was determined not to be subject to NSPS.

The emission control device on the air discharge of the dryer is a MS Super Scrubber Package System manufactured by Fisher-Klosterman, Inc. to remove particulates from the exhaust which exits to stack #6. The MS Super Scrubber Package System utilizes a venturi scrubber followed by a cyclonic separator to remove mist from the vent air stream. GAC has proposed that the control system is better than 99.5% effective in removing particles 4 microns or greater in diameter, based on tests by the manufacturer. The expected emissions from the dryer scrubber should be well below the EPA NSPS limit for new ammonium sulfate dryers of 0.3 lb PM/ton product.

In February 1994 the dryer emissions were tested and found to be 0.044 lb PM/ton product and is therefore considered by the Department to be meeting BPT.

E. Sodium Aluminate Production

The sodium aluminate production operation was installed in 1982. Sodium aluminate is produced in 4,000 gallon batches in an atmospheric reactor by reacting aluminum trihydrate with sodium hydroxide. The reaction has an insignificant exotherm and therefore indirect heat must be added throughout the reaction via steam coils. The reactor stack is essentially an atmospheric vent to permit the release of water vapor from the reactor head space to the building exterior instead of releasing the vapor into the operator work space.

F. Aluminum Trihydrate Handling Systems

Currently GAC uses wet (6-10% moisture) aluminum trihydrate (ATH) which is transferred to GAC by dump truck once or twice per week and fed into the process via an inclined belt conveyor.

GAC also has a pneumatic conveyor system to handle dry ATH which is not being used. While a change back to using dry ATH is not anticipated in the foreseeable future, it is the intention of GAC to maintain the pneumatic system in operational condition in the event of a wet ATH supply problem.

The pneumatic conveyor system components include a storage silo, a weigh hopper, a product filter receiver, a vacuum filter receiver, two blowers, and associated piping and controls. The storage silo, weigh hopper, product filter receiver, and vacuum filter receiver all have baghouses (4 total) on the exhausts for particulate control. However, the storage silo baghouse vent is the only stack which vents directly outside. The other three vent inside existing buildings. Visible emissions from the storage silo baghouse shall be limited to 5% opacity on a six minute block average basis.

G. Aqueous Ammonia Production

The aqueous ammonia production operation was installed in 1995. Aqueous ammonia is produced by the mixing of anhydrous ammonia with water. Approximately 90 Btu/lb of 30% aqueous ammonia is generated as a result of the dilution of ammonia with water. Therefore, heat is removed by a refrigeration system in order to keep the ammonia in solution and thus prevent any air emissions at atmospheric pressures. The entire mixing process of the aqueous ammonia is enclosed and emissions are collected by the Ammonia Wet Scrubber System.

After a batch of the solution is mixed, the product is transferred to storage or to vehicles transporting the aqueous ammonia from the facility. As the batch of solution is transferred the displaced air is collected and controlled by the Ammonia Wet Scrubber System.

The Ammonia Wet Scrubber System is a two stage scrubbing configuration composed of a venturi scrubber followed by a passive scrubber. The first scrubber stage is a venturi scrubber that recirculates the vapor in the system. Fresh water is used in the scrubber for each new production batch. The weak aqueous ammonia solution that is produced in the scrubber is used for production startup on the next batch. The second stage scrubber is a passive bubble tank partially filled with weak (5%) sulfuric acid. Any air that is displaced from the production system bubbles through the weak acid and reacts to form ammonium sulfate. This small quantity of ammonium sulfate is later processed in the ammonium sulfate system.

The storage of aqueous ammonia is comprised of two closed vessels with concrete containment and all vapor spaces for the tanks shall be collected and controlled by the Ammonia Wet Scrubber System. All displaced air as a result of product transfer to a transportation vehicle shall also be collected and controlled by the Ammonia Wet Scrubber System.

Based on the above, the Department finds that the use of the Ammonia Wet Scrubber System meets BPT.

H. Fish Oil Processing

GAC has requested the addition of a fish oil processing operation to their license. The fish oil processing operation was installed in 1999. Two basic types of processed oil are produced, oxidized or “blown oil” and bisulfited blown oil. Oxidized oil is produced by pumping air into the agitated and heated oil. A slight exotherm is produced and must be removed via indirect cooling using a closed loop water system. Bisulfited blown oil is produced by further processing in the same vessel.

The discharge air is scrubbed in a Vanaire Model VT-550 Scrubber. The gas stream contains oil mist/particulates and a small fraction of byproduct formic acid vapor. The gas stream is hot (240°F) and dilution air is added to reduce the temperature of the stream.

The scrubber liquid is maintained at a neutral pH by addition of sodium hydroxide by an automatic pH control system. The sodium hydroxide combines with the oil particulates to form a crude soap (solid) and facilitates the complete absorption and neutralization of formic acid vapor.

The bisulfiting process does not have any forced or process generated emissions. However, the bisulfiting chemicals may produce sulfur dioxide vapors in the vessel vapor space. Since the operators need to occasionally open the vessel door to observe the process, a negative pressure is maintained in the vessel by the

scrubbing system. Dilution air is not used during this process. Any sulfur dioxide carried to the scrubber is absorbed by the scrubber liquid.

At the end of each batch the scrubber liquid is pumped out, bulked with sawdust and shipped to Penobscot Energy Recovery Company.

Based on the above the Department finds that the use of the Vanaire Scrubber System for the collection and control of all emissions from the production of oxidized and bisulfited blown oil by GAC to be BACT.

I. Annual Emission Restrictions

GAC shall be restricted to the following annual emissions, based on a 12 month rolling total:

Total Allowable Annual Emission for the Facility
(used to calculate the annual license fee)

<u>Pollutant</u>	<u>Tons/Year</u>
PM	8.9
PM ₁₀	8.9
SO ₂	46.7
NO _x	19.1
CO	2.1
VOC	0.1

III.AMBIENT AIR QUALITY ANALYSIS

According to the Maine Regulations Chapter 115, the level of air quality analyses required for a renewal source shall be determined on a case-by case basis. Modeling and monitoring are not required for a renewal if the total emissions of any pollutant released do not exceed the following:

<u>Pollutant</u>	<u>Tons/Year</u>
PM	50
PM ₁₀	25
SO ₂	50
NO _x	100
CO	250

Based on the above total facility emissions, GAC is below the emissions level required for modeling and monitoring.

ORDER

Based on the above Findings and subject to conditions listed below, the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards,
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants Air Emission License A-171-71-J-M/R subject to the following conditions:

- (1) Employees and authorized representatives of the Department shall be allowed access to the licensee's premises during business hours, or any time during which any emissions units are in operation, and at such other times as the Department deems necessary for the purpose of performing tests, collecting samples, conducting inspections, or examining and copying records relating to emissions.
- (2) The licensee shall acquire a new or amended air emission license prior to commencing construction of a modification, unless specifically provided for in Chapter 115.
- (3) Approval to construct shall become invalid if the source has not commenced construction within eighteen (18) months after receipt of such approval or if construction is discontinued for a period of eighteen (18) months or more. The Department may extend this time period upon a satisfactory showing that an extension is justified, but may condition such extension upon a review of either the control technology analysis or the ambient air quality standards analysis, or both.
- (4) The licensee shall establish and maintain a continuing program of best management practices for suppression of fugitive particulate matter during any period of construction, reconstruction, or operation which may result in fugitive dust, and shall submit a description of the program to the Department upon request.
- (5) The licensee shall pay the annual air emission license fee to the Department, calculated pursuant to Title 38 M.R.S.A. § 353.

- (6) The license does not convey any property rights of any sort, or any exclusive privilege.
- (7) The licensee shall maintain and operate all emission units and air pollution systems required by the air emission license in a manner consistent with good air pollution control practice for minimizing emissions.
- (8) The licensee shall maintain sufficient records to accurately document compliance with emission standards and license conditions and shall maintain such records for a minimum of six (6) years. The records shall be submitted to the Department upon written request.
- (9) The licensee shall comply with all terms and conditions of the air emission license. The filing of an appeal by the licensee, the notification of planned changes or anticipated noncompliance by the licensee, or the filing of an application by the licensee for a renewal of a license or amendment shall not stay any condition of the license.
- (10) The licensee may not use as a defense in an enforcement action that the disruption, cessation, or reduction of licensed operations would have been necessary in order to maintain compliance with the conditions of the air emission license.
- (11) In accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department, the licensee shall:
 - (i) perform stack testing to demonstrate compliance with the applicable emission standards under circumstances representative of the facility's normal process and operating conditions:
 - a. within sixty (60) calendar days of receipt of a notification to test from the Department or EPA, if visible emissions, equipment operating parameters, staff inspection, air monitoring or other cause indicate to the Department that equipment may be operating out of compliance with emission standards or license conditions; or
 - b. pursuant to any other requirement of this license to perform stack testing.
 - (ii) install or make provisions to install test ports that meet the criteria of 40 CFR Part 60, Appendix A, and test platforms, if necessary, and other accommodations necessary to allow emission testing; and
 - (iii) submit a written report to the Department within thirty (30) days from date of test completion.

- (12) If the results of a stack test performed under circumstances representative of the facility's normal process and operating conditions indicate emissions in excess of the applicable standards, then:
- (i) within thirty (30) days following receipt of such test results, the licensee shall re-test the non-complying emission source under circumstances representative of the facility's normal process and operating conditions and in accordance with the Department's air emission compliance test protocol and 40 CFR Part 60 or other method approved or required by the Department; and
 - (ii) the days of violation shall be presumed to include the date of stack test and each and every day of operation thereafter until compliance is demonstrated under normal and representative process and operating conditions, except to the extent that the facility can prove to the satisfaction of the Department that there were intervening days during which no violation occurred or that the violation was not continuing in nature; and
 - (iii) the licensee may, upon the approval of the Department following the successful demonstration of compliance at alternative load conditions, operate under such alternative load conditions on an interim basis prior to a demonstration of compliance under normal and representative process and operating conditions.
- (13) Notwithstanding any other provisions in the State Implementation Plan approved by the EPA or Section 114(a) of the CAA, any credible evidence may be used for the purpose of establishing whether a person has violated or is in violation of any statute, regulation, or Part 70 license requirement.
- (14) The licensee shall maintain records of malfunctions, failures, downtime, and any other similar change in operation of air pollution control systems or the emissions unit itself that would affect emission and that is not consistent with the terms and conditions of the air emission license. The licensee shall notify the Department within two (2) days or the next state working day, whichever is later, of such occasions where such changes result in an increase of emissions. The licensee shall report all excess emissions in the units of the applicable emission limitation.
- (15) Upon written request from the Department, the licensee shall establish and maintain such records, make such reports, install, use and maintain such monitoring equipment, sample such emissions (in accordance with such methods, at such locations, at such intervals, and in such a manner as the Department shall prescribe), and provide other information as the Department may reasonably require to determine the licensee's compliance status.

(16) **Boilers #1 & #2**

- A. Capacity shall not exceed 20.7 MMBtu/hr for Boiler #1 and 6.9 MMBtu/hr for Boiler #2.
- B. Fuel use shall not exceed a total of 850,000 gal/yr of #2, 5, or 6 fuel oil (12 month rolling total) with a maximum sulfur content not to exceed 0.7% by weight. Fuel use records shall be maintained on a monthly basis, in addition to the 12 month rolling total.
- C. Emissions shall not exceed the following:

Equipment		PM	PM ₁₀	SO ₂	NO _x	CO	VOC
Boiler #1	lb/MMBtu	0.12	0.12	-	-	-	-
	lb/hr	2.48	2.48	15.17	6.21	0.69	0.04
Boiler #2	lb/MMBtu	0.12	0.12	-	-	-	-
	lb/hr	0.83	0.83	5.06	2.07	0.23	0.01

- D. Visible emissions from Boilers #1 & 2 shall not exceed 30% opacity on a 6 minute block average, except for no more than 2 six minute block averages in a continuous 3 hour period.

(17) **Ammonium Sulfate Production**

- A. Particulate emissions from the ammonium sulfate dryer shall not exceed 0.3 lb/ton of ammonium sulfate produced.
- B. GAC shall continue to operate a demister and cyclonic separator on the ammonium sulfate reactor/crystallizer.
- C. GAC shall continue to operate the MS Super Scrubber Package System on the ammonium sulfate dryer discharge.

(18) **Aqueous Ammonia Production**

- A. GAC shall continue to operate the Ammonia Wet Scrubber System.

(19) **Fish Oil Processing System**

- A. GAC shall continue to operate the Vanaire Scrubber on the Fish Oil Processing System.
- B. GAC shall maintain a negative pressure on the processing vessel when the bisulfiting process is operating.

(20) **Pneumatic Aluminum Trihydrate Conveyor System**

- A. GAC shall keep a maintenance log recording the date and location of all bag failures as well as all routine maintenance for all baghouses associated with the pneumatic conveyor system to handle dry aluminum trihydrate.
- B. Visible emissions from the aluminum trihydrate storage silo baghouse shall not exceed 5% opacity on a six minute block average basis.

(21) **Facility Emissions**

Facility emissions shall be limited to the following, based on a 12 month rolling total:

<u>Pollutant</u>	<u>Tons/Year</u>
PM	8.9
PM ₁₀	8.9
SO ₂	46.7
NO _x	19.1
CO	2.1
VOC	0.1

- (22) The term of this Order shall be for five (5) years from the signature below.

DONE AND DATED IN AUGUSTA, MAINE THIS DAY OF 2000.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: _____
MARTHA G. KIRKPATRICK, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 1/27/00

Date of application acceptance: 2/1/00

Date filed with the Board of Environmental Protection: _____

This Order prepared by Lynn Ross, Bureau of Air Quality.